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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

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April 9, 1997

Mr. Peter Cowhey  
Chief, International Bureau  
Federal Communications Commission  
2000 M Street, N.W., Room 830  
Washington, D.C. 20554

Re: Ex-Parte Submission  
IB Docket No. 96-220

Dear Mr. Cowhey:

I am writing to state Leo One USA Corporation's position concerning the various Little LEO band plans proposed to the Commission during the last several weeks. Specifically, Leo One USA wants to make it absolutely clear that if the Commission requires Leo One USA to operate its service or feeder downlinks in the 137 MHz band, it cannot implement a system capable of offering 100% availability over CONUS as proposed in its application. Leo One USA does not believe that a system that offers intermittent store and forward services is economically viable and will not proceed to implement such a system. Therefore, adoption of a band plan that requires all large systems to operate at least a portion of their systems in the 137 MHz band, as proposed by Final Analysis, will, in effect, be a denial of Leo One USA's application. Leo One USA believes that such a decision will deprive the public of access to near real-time services and will preclude the development of effective competition to Orbcomm.

At the outset it is important to reiterate Leo One USA's interests. As you know, Leo One USA has an application pending to implement a 48 satellite Little LEO system. Based on the extensive experience of Leo One USA's principals in terrestrial wireless communication services, the Leo One USA business plan and system design were carefully crafted to support the provision of service, without delays, to consumers over the CONUS latitudes. This means that a customer must be able to send and receive a message at any time. In order to meet this requirement, a virtual complete circuit (including uplink and downlink feederlinks and uplink and downlink service links) must be established. Failure to obtain any of these four links at any time will prevent Leo One USA from offering 100% availability to its customers. We have referred to this requirement as near real-time service.

Our experience demonstrates that the vast majority of consumers require near real-time access to communications networks and many will not accept any delay in the delivery or receipt of

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their messages, whether cellular, paging, Internet access or two-way data communications. The economic analysis prepared by Microeconomic Consulting and Research Associates, Inc. ("MiCRA") appearing as Exhibit "A" to Leo One USA's Comments describes market requirements for 100% availability. The MiCRA analysis demonstrates that satisfying many of the consumer requirements for Little LEO services are dependent on a system's ability to offer near real-time services. This requirement accounts for at least one-third of the markets identified in the MiCRA economic analysis and at least 60% of Leo One USA's anticipated revenues. Thus, if Leo One USA is not able to obtain a license that will allow it to offer near 100% availability, it will not be able to serve the markets that are the foundation of Leo One USA's business plan. This will destroy the economic viability of the Leo One USA Little LEO satellite system.

The technical design of the Leo One USA system was carefully developed to meet this near real-time goal. This included the number of satellites, inclination of the orbital planes, the altitude of the satellites as well as many other orbit parameters. Leo One USA has invested considerable expense and time to adapt its original design to operate in the 400 MHz band and meet the time-sharing requirements of the government METSAT systems. The need to engineer the system to provide near real-time services and to comply with the METSAT time-sharing obligations has imposed significant technical constraints on Leo One USA and resulted in a sizable capacity reduction from Leo One USA's original application. As a result, Leo One USA does not have the flexibility of some of the other Little LEO proponents. This means that any significant technical modifications resulting from the Commission's final band plan will have a much greater impact on the Leo One USA system design and correspondingly on the Leo One USA business plan than would be the case for any other second round applicant.

As you know, Leo One USA devoted an extraordinary amount of technical resources to developing its METSAT time-sharing approach. Leo One USA's efforts will benefit the entire Little LEO industry and are a marked contrast from the efforts of the other applicants who have failed to even provide a minimal level of technical support to justify their proposed solution. We continue to believe that it is possible for all applicants to meet their stated goals in this proceeding. However, if the Commission decides to create two fungible larger systems, as proposed in the X/Y plan, it will preclude implementation of the Leo One USA business plan while allowing all other new second round applicants to proceed with their current plans. The X/Y plan assigns Final Analysis significantly more spectrum than it requested in its pending application and thereby significantly expands Final Analysis' capacity. The X/Y plan will not serve the public interest and will merely help fortify the existing competitive position of Orbcomm.

There are two critical issues that now must be addressed as the Commission proceeds toward the adoption of a band plan. First, the Commission must decide whether the public will be served best by the licensing and implementation of a new near real-time system. We believe the record in this proceeding is clear on this point. There is an immediate requirement for new near real-time services. No contrary evidence has been introduced into the record. Second, if the Commission decides that it wants to license near real-time systems, it must determine if the band plan it adopts

will allow the implementation of such systems. As is discussed in greater detail below, the X/Y band plan will make it impossible for Leo One USA to implement its proposed near real-time system, and no other system with 100% availability to the CONUS latitudes has been proposed.<sup>1</sup>

There are two relevant plans that Leo One USA understands the Commission is still considering: Leo One USA's A/B plan<sup>2</sup> and Final Analysis' X/Y plan. These plans differ only in how Leo One USA and Final Analysis are accommodated. Both CTA and E-SAT are treated equally under the two plans. In assessing the practical impact of these two plans on Leo One USA and Final Analysis, the Commission must recognize that these two satellite systems are entirely different in number of satellites, spectrum requirements and the markets to be served. In particular, Leo One USA is prepared to implement a near real-time system in the currently allocated bands. Final Analysis has approximately one-half of the number of satellites of Leo One USA and has requested in its pending application<sup>3</sup> 68% of the downlink spectrum requirements of Leo One USA. The larger Leo One USA system is a function of the requirement to maintain 100% availability over CONUS. On the other hand, Final Analysis has an application pending for a system with less than 100% availability and has repeatedly stated that it will actually implement a system that will be capable of providing 65% availability when time-sharing with METSAT satellites. The different business requirements and service offerings to the public of the Final Analysis and Leo One USA satellite systems result in vastly different technical designs and system architectures. Imposing fungible spectrum assignments on these two systems and treating their respective requirements as equal expands Final Analysis' capacity while eliminating Leo One USA's ability to implement its proposed system.

If the band plan is structured properly, the Commission will be able to license new competitive systems allowing the public to reap the benefits of competitive Little LEO markets. If not, most markets remain unserved or will be served by a single monopoly provider -- Orbcomm -- for the foreseeable future. As the Commission assesses the implications of the band plans, its analysis should focus on the following three factors:

- Availability: A system's availability is defined by the number and orientation of satellites in its constellation. The Commission should consider whether each applicant will be able to obtain the availability and thereby serve the markets it seeks to under the proposed plan.

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<sup>1</sup> See Reply Comments of Leo One USA, January 13, 1997 at Appendix B. This is verified by an independent analysis performed by Autometrics, Inc. of all proposed systems as represented in the pending applications. Autometrics is considered to be an independent expert and is well known for its ability to model constellation performance.

<sup>2</sup> The description of the A/B plan appears as Attachment A to this letter.

<sup>3</sup> See Final Analysis Application Amendment, February 23, 1996, at II-10.

- Capacity: Can an applicant obtain access to a quantity of spectrum to meet the requirements articulated in its pending application?
- Coordination: Applicants are proposing very different uses of the Little LEO spectrum. For example, some systems may have greater flexibility than others to accept interference or to operate on a secondary basis. The Commission's analysis should consider whether the spectrum provided to a particular applicant can be successfully coordinated for that applicant's needs.

A review of the impact of the A/B plan and X/Y plan reveals that the A/B plan will accommodate all immediate requirements of CTA, E-SAT, Final Analysis and Leo One USA, while the X/Y plan will only accommodate the requirements of CTA, E-SAT and Final Analysis.<sup>4</sup> The X/Y plan will not accommodate the requirements of Leo One USA. The following provides an analysis of the impact of these plans on all new applicants:

- CTA: Under either the A/B plan or the X/Y plan CTA will be able to meet all the requirements of its proposed 12 satellite system. It will be able to provide the availability it requires and meet its capacity requirements. The coordination issues for CTA are the same under the A/B plan and the X/Y plan.
- E-SAT: Under either the A/B plan or the X/Y plan, E-SAT will be able to meet all the requirements of its proposed six satellite CDMA system. It will be able to meet its availability and capacity requirements. As is the case with GE Starsys, the coordination issues for E-SAT are likely to be easier under the A/B plan than under the X/Y plan.<sup>5</sup>
- Final Analysis: Even though Final Analysis is actively promoting the X/Y plan, the A/B plan more closely meets requirements articulated in the record by Final Analysis.

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<sup>4</sup> The X/Y plan makes pretenses of accommodating the existing licensees without any technical justification. However, a close examination, based on actual technical analysis, reveals that the coordination of existing and new licensees' spectrum requirements would be extremely difficult, if not impossible, under the X/Y plan. Nevertheless, Leo One USA does not believe that the pending modification applications of the existing licensees should be dismissed. Rather, the existing modification requests could be granted to the extent possible after the new applicants' requirements are accommodated. Moreover, the Orbcomm 1995 pending 137 MHz frequency shift modification can be granted if the Commission adopts the A/B plan. It also should be noted that Orbcomm's partner OHB has evidently caused the German administration to submit Appendix 4 material to the ITU for the 399.9 - 400.05 MHz band giving Germany a priority to this spectrum vis-a-vis the United States. Presumably, this will benefit Orbcomm.

<sup>5</sup> The addition of Leo One USA in the 137 MHz band sufficiently increases coordination difficulties as a result of a large number of satellites introducing additional energy into GE Starsys' gateway system. The same coordination issue will face E-SAT.

Specifically, Final Analysis has repeatedly stated that it would like to provide a near real-time service. However, it has repeatedly indicated that it will only provide 65% availability when time sharing with a METSAT constellation. Under the X/Y plan Final Analysis will always need to time-share with a DMSP constellation, restricting its availability for the foreseeable future to no more than 65%. A further reduction in availability occurs under the X/Y plan as a result of the joint probability of conflict on either feeder or subscriber links when sharing with both NOAA and DMSP METSAT constellations. However, under the A/B plan, Final Analysis would initially not need to time share with METSATS in the LRPT channels and therefore could operate without impact to its availability. After NOAA vacates the APT and TIP channels, Final Analysis could move into the center of the band without a time sharing requirement.<sup>6</sup> These four channels would provide Final Analysis 240 kHz of spectrum. This is 5 kHz more than the 235 kHz requested in Final Analysis' pending application. Thus, Final Analysis will have access to 100% of its service link and feederlink spectrum requirements.<sup>7</sup> Moreover, under the A/B plan Final Analysis will actually be able to increase its availability above 65%.<sup>8</sup> Finally, Final Analysis' 26 satellite system can be successfully coordinated in the 137 MHz band. It has provided no technical information in the record of this proceeding to the contrary. Moreover, to this day it has never provided any technical analysis explaining why it cannot operate in the 137 MHz band.

- Leo One USA: Leo One USA can only implement its proposed system under the A/B plan. This plan provides Leo One USA the ability to provide 100% availability over CONUS. It also provides sufficient capacity to support Leo One USA's business plan and ensure the economic viability of its 48 satellite system. Under this approach, the Leo One USA system can be coordinated with existing users. On the other hand, as outlined in the Leo One USA March 27, 1997 *ex parte* filing, under the X/Y plan Leo One USA can provide no more than 85% availability over CONUS. This is because of the statistical likelihood of either a service link or feeder link being unavailable as a result of the joint time sharing requirements with DMSP and NOAA. This number will be further reduced if Leo One USA is required to turn off a satellite when in the

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<sup>6</sup> It is Leo One USA's understanding that a total of 240 kHz could be made available in all four APT and TIP channels including guard bands. This includes the 137.325 - 137.375, 137.4725 - 137.535, 137.585 - 137.6505 and 137.7405 - 137.8025 MHz channels.

<sup>7</sup> Final Analysis could fit its nine service links and three feederlinks into the TIP and APT channels.

<sup>8</sup> Final Analysis will need to coordinate with GE Starsys if it migrates to the APT and TIP channels. In this situation, Final Analysis may be required to reduce power when in the main beam of a GE Starsys gateway. However, for Final Analysis this will only be approximately 20% of the time. Under this scenario, Final Analysis could be able to provide significantly more (80% or more) availability under the A/B plan while it remains constricted to 65% or less availability under the X/Y plan. This should allow Final Analysis to meet its design goal for availability as described in its pending application.

main beam of a GE Starsys satellite.<sup>9</sup> Furthermore, the X/Y approach provides Leo One USA insufficient feeder links to support its system requirements. Finally, the technical design of the Leo One USA satellite system will make it extremely difficult for a successful coordination to be concluded with GE Starsys.

As demonstrated above, Final Analysis' capabilities can be successfully accommodated under either the A/B plan or the X/Y plan. Under either approach, Final Analysis will still establish a system capable of providing at least 65% availability. It will also be able to implement its 26 satellite system and have access to the amount of spectrum requested in its pending application. When all Final Analysis' hyperbole is stripped away, it becomes clear that the only reason it can articulate for wanting to operate in the 400 MHz band is the "investment" it has made in its experimental satellite system. This should not be the basis for the Commission's decision in this proceeding. It would contravene long standing Commission precedent and would set a dangerous policy for the Commission to grant preferences based on investments made pursuant to anything less than a commercial license. The Commission has not hesitated to remind experimental licensees and recipients of 319(d) waivers that investments are made at their own peril.<sup>10</sup> Final Analysis should not be allowed to bootstrap its way into the 400 MHz band because of investment made pursuant to

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<sup>9</sup> Due to the large size of the Leo One USA system and its orbit architecture, the downlink falls into the GE Starsys mainbeam an average 35% of the time over CONUS and as high as 44% depending upon gateway location.

<sup>10</sup> The Commission has articulated a very straightforward policy on this issue. For example, in the case of GTE Airfone's air-ground telephone system, the Commission granted GTE Airfone experimental licenses with the understanding that it would not confer upon GTE Airfone any preferences:

GTE was advised that grant of the [experimental license] application will not confer preferred status on GTE Airfone or in any way influence the outcome of the Commission's planned Rule Making on the 4 MHz. Rather, the outcome of the Commission's proceeding as to the best use of [this frequency] on a permanent basis will be dictated solely by the Commission's public interest standard. . . . [T]he Commission will not consider GTE Airfone's status as the incumbent user of this spectrum or the costs incurred by GTE Airfone in converting from its present use of [the bands]. *This is the case for any experimental authorization.*

2 FCC Rcd. 6830 (1987) at n. 60 (emphasis added). This position is the only reasonable application of Section 5.68 of the Commission's Rules. 47 C.F.R. §5.68 (for an experimental license, "the authority to use the frequency or frequencies assigned . . . does not confer any right to conduct an activity of a continuing nature").

an experimental authorization.<sup>11</sup> Moreover, as the Commission is well aware, Leo One USA has made a significant financial and manpower investment in developing the means to make it possible for Little LEOs to consider use of the 137 MHz and 400 MHz band. This is an investment that may allow the Commission to resolve this proceeding and concomitantly benefit all Little LEO interests. On the other hand, if the FCC chooses to adopt the X/Y plan it will only have one appreciable result -- it will preclude Leo One USA from implementing its system in favor of accommodating Final Analysis' request to leverage off its experimental investment and to provide a lesser degree of availability.<sup>12</sup> Ultimately, this approach will deny the public access to new near real-time services and encourage the continued development of monopoly Little LEO markets. Such an action is inconsistent with the record in this proceeding and cannot be judged to be the result of "reasoned decisionmaking."

The decision now facing the Commission is whether it should accommodate Leo One USA's interest in implementing a near real-time system with reduced capacity from its original application or Final Analysis' desire to expend its system capacity. As we have stated on numerous occasions since Leo One USA's application was filed in October 1993, Leo One USA is financially prepared to implement a near real-time Little LEO system in the existing allocation. All we seek is the opportunity to obtain a license from the Commission. We therefore respectfully request that the Commission adopt the A/B plan described in Attachment A to this letter.

Once the band plan has been determined, a mechanism must be developed to issue licenses. If there are four licenses, as proposed by Leo One USA's A/B plan attached hereto, the Commission must decide which applicant is to be assigned which license. Leo One USA believes that the Commission should use its existing rules and policies in the following manner to assign licenses. First, the Commission should adopt the A/B band plan and its proposed rules on financial qualifications and existing licensee eligibility. Second, those applicants determined to be financially qualified should be given preferential rights to a license vis-a-vis unqualified applicants. This process will establish a priority among the qualified applicants for each available license. Third, if all the applicants are deemed qualified and the Commission is unable to establish a priority, the existing license assignment criteria used for the domestic satellite service should be used to make Little LEO license assignments. In particular, when making domsat orbit assignments, the Commission examines "the volume and distribution of traffic requirements, constraints imposed by satellite design, plans of other countries for their satellites, and equitable treatment of existing and

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<sup>11</sup> Leo One USA notes that the Bureau has very recently reiterated its views on the limited rights conveyed with an experimental license when it ordered Satellife, Inc. to terminate operation of its Healthsat II satellite upon launch of the VITASAT-1R satellite. If the public interest is not served by allowing a humanitarian non-profit operation to continue based on its investment in satellite hardware at a particular frequency, it is inconceivable that the Commission would find the public interest is served by advancing a commercial operation based solely on an investment in terminal equipment.

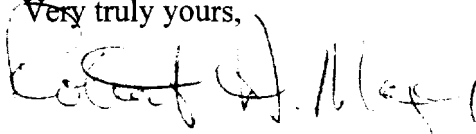
<sup>12</sup> Leo One USA also notes Final Analysis' decision not to frequency hop would constitute a less efficient use of the 400 MHz band and would waste this valuable spectrum.

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new domestic satellite operations.<sup>13</sup> For the Little LEO service the Commission, when making spectrum assignments, should examine: (1) the amount of feederlink and service link spectrum necessary to meet the applicant's business requirement as specified in the applicant's pending application; (2) the system availability required giving consideration to the constraints imposed by METSAT time-sharing; and (3) the relative coordination issues associated with each application and each potential license. Given that the system design of each of the pending applicants are vastly different, it may be possible to match the applicant's different requirements with an available license. This process should enable the Commission to license all pending applicants in an equitable manner.

We urge the Commission to use these policies to bring this proceeding to a successful conclusion.

Very truly yours,

A handwritten signature in black ink, appearing to read "Robert A. Mazer", written over a horizontal line.

Robert A. Mazer  
Counsel for Leo One USA Corporation

RAM:dks

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<sup>13</sup>

See Memorandum Opinion and Order, FCC 85-396, released August 27, 1985 at para. 5.



## **Appendix A**

### **BAND PLAN**

#### **1. System A**

##### **a. Downlinks:**

Feederlinks and service links would operate in 400 MHz band.

##### **b. Uplinks**

Service links would operate in the 148.905 - 149.9, 455 - 456, and 459 - 460 MHz bands.

Feederlinks would operate in 50 kHz in 149.9 - 150.05 MHz band.

#### **2. System B1**

##### **a. Downlinks**

Feederlinks and service links would operate in the following spectrum:

- Phase 1 (Prior to migration of APT and TIP channels to LRPT band)

137.075 - 137.175 MHz

139.825 - 139.950 MHz

- Phase 2 (After migration of APT and TIP channels to LRPT band)

137.325 - 137.375 MHz<sup>1</sup>

137.4725 - 137.535 MHz

137.5850 - 137.6505 MHz

137.7405 - 137.8025 MHz

Plus all spectrum available in the LRPT channels.

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<sup>1</sup> These channels include NOAA guard bands. Orbcomm has indicated that coordination discussions with NOAA may mitigate the need for Orbcomm to migrate to two of these channels. It is our understanding from NOAA that there is no longer a need for Orbcomm to move any operations into the NOAA channels.

- Or the licensee can immediately begin with operations in the APT and TIP channels coordinating with both NOAA and Starsys.<sup>2</sup>

b. Uplinks

Service links would operate in the 149.905 - 149.9, 455 - 456 and 459 - 460 MHz bands.

Feederlinks would operate in the 50 kHz in 149.9 - 150.05 MHz band.

3. System B2

a. Downlinks

137.025 - 137.075 MHz

137.950 - 139.000 MHz

b. Uplinks

Service links would operate in the 149.905 - 149.9, 455 - 456 and 459 - 460 MHz bands.

Feederlinks would operate in 50 kHz in the 399.9 - 400.05 MHz band. If this spectrum cannot be successfully coordinated with the German administration, this system would be provided 25 kHz in the 149.9 - 150.05 MHz band. This 25 kHz would be time-shared with System A. The remaining available feeder uplink spectrum would be divided equally between System A and System B1.

4. System B3

a. Uplinks

148 - 149.810 MHz using spread spectrum.

b. Downlinks

137 - 138 MHz using spread spectrum.

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<sup>2</sup>

Operation with GE Starsys will at worst require the licensee using the APT and TIP channels to power down or turn-off a satellite when in the mainbeam of the GE Starsys gateway. This could cause a reduction in system availability. However, this effect is proportional to the size of the constellation and the resulting probability of having satellites in the mainbeam of a GE Starsys gateway. For the Final Analysis system of 26 satellites, the reduction in availability would be considerably less than that caused by sharing with METSATS.

5. Existing licensees

Existing licensees would have priority vis-a-vis the assignees of systems A, B1, B2 and B3 to obtain any remaining or newly allocated spectrum in order to fulfill requests in their pending second round applications.

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